

# 15\_04 Converting Quantities in NCWedge

**Question:**

How do you convert the quantities from NCWedge to a tonnage value for pavement estimates?

**Answer:**

NCWedge produces a volume quantity in cubic feet (ft<sup>3</sup>) or cubic meter (m<sup>3</sup>) in the wedging quantity file (\*.WQF).

Project: WEDGING PAVEMENT QUANTITIES

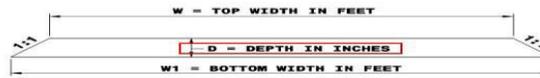
Engineer:

STATION	END AREAS			CUBIC VOLUMES		
	S9.5X	I19.0Z	B25.0	S9.5X	I19.0Z	B25.0
10+20.000	0.00	0.00	0.00	0.00	0.00	0.00
10+40.000	0.00	0.00	0.00	0.00	0.00	0.00
30+50.000	0.00	0.00	0.00	0.00	0.00	0.00
30+70.000	0.00	0.00	0.00	0.00	0.00	0.00
<b>Totals:</b>		<b>80.42</b>	<b>164.92</b>	<b>67.67</b>		

Simply multiply this volume quantity by the density (or the rate) of the pavement type to get the tonnage value. Note there is a major difference between how the pavement quantities are derived from hand computation and from NCWedge volume quantities. The unit for the pavement depth is in Inches (in) or Millimeters (mm).

Formula for Surface Course, Type S9.5C (English)

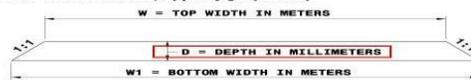
**ASPHALT CONCRETE SURFACE COURSE  
TYPE S9.5C**



CALCULATE:  

$$\text{LENGTH} \times \frac{(W+W1) \times D \times 112 \text{ lb} / \text{yd}^2 / \text{in}}{9 \text{ ft}^2 / \text{yd}^2 \times 2000 \text{ lb} / \text{ton}} = \text{TONS}$$

Formula for Surface Course, Type S9.5C (Metric)



CALCULATE:  

$$\text{LENGTH} \times \frac{W+W1}{2} \times D \times 2.40 \text{ kg} / \text{m}^2 / \text{mm}}{1000 \text{ kg} / \text{mtn}} = \text{MTN}$$

Since NCWedge volume quantities are in cubic feet (ft<sup>3</sup>) or cubic meter (m<sup>3</sup>) units, the formulae have to adjust for both english and metric.

For english, through canceling of units, the tonnage value is derived from the following formula.

NCWedge Volume (ft<sup>3</sup>) X 12<sup>3</sup> / ft<sup>3</sup> X Pavement Density (lbs/ft<sup>3</sup> · in)

$$9 \text{ ft}^3 / \text{yd}^3 \times 2000 \text{ lbs} / \text{ton}$$

For metric, through canceling of units, the metric tonnage value is derived from the following formula.

NCWedge Volume (m<sup>3</sup>) X 1000 mm<sup>3</sup> / m<sup>3</sup> X Pavement Density (kg/m<sup>2</sup> · mm)

$$1000 \text{ kg} / \text{mtn}$$

Note the top 1000 cancels out the bottom 1000, reducing the metric formula to simply:

NCWedge Volume X Pavement Density

Below are examples of converting NCWedge volume quantities to weight quantities only. Note the difference between these formulae and the formulae above for hand computation with the pavement depths in Inches or Millimeters.

**Example 1.**

100 ft<sup>3</sup> of surface course, type S9.5C, yields 7.5 tons.

$$100 \times 12^3 \times 112 \text{ (S9.5C density or rate)} = 7.5 \text{ TON}$$

$$9 \times 2000$$

**Example 2.**

100 m<sup>3</sup> of surface course, type S9.5C, yields 240 metric tons.

$$100 \times 2.40 \text{ (S9.5C density or rate)} = 240 \text{ MTN}$$

For faster calculations, the following table can be used when converting NCWedge volumes to weight/tonnage values for estimates. Simply multiply the NCWedge volume by the density factor listed below.

Mix Type	Rate (lbs/ft <sup>3</sup> · in)	English Factor (ton/ft <sup>3</sup> )	Rate (kg/m <sup>2</sup> · mm)	Metric Factor (mtn/m <sup>3</sup> )
<b>Surface</b>				
S4.75A	100	0.067	2.15	2.15
SP9.5A	110	0.073	2.35	2.35
S9.5B	112	0.075	2.40	2.40
S9.5C	112	0.075	2.40	2.40
S9.5D	112	0.075	2.40	2.40
S12.5C	112	0.075	2.40	2.40
S12.5D	112	0.075	2.40	2.40
<b>Intermediate</b>				
I19.0B	114	0.076	2.45	2.45
I19.0C	114	0.076	2.45	2.45
I19.0D	114	0.076	2.45	2.45
<b>Base</b>				
B25.0B	114	0.076	2.45	2.45
B25.0C	114	0.076	2.45	2.45
PADC, P-57	90	0.060	1.95	1.95
PADC, P-78M	90	0.060	1.95	1.95